Illinois Department of Transportation

Memorandum

To: ALL BRIDGE DESIGNERS 05.2

From: Ralph E. Anderson

Subject: New PPC I-Beam and Bulb-T Beam Base Sheets With Bursting Steel Details

Date: July 15, 2005

This ABD memo is a follow-up to the precast prestressed concrete research described in ABD memo 05.1. The latest efforts of this work have led to the development of new bursting steel details in the beam ends of PPC I–Beams and Bulb-T Beams, an initial sealant requirement on the beam ends, a revised shear stirrup reinforcement size and configuration and revised base sheets depicting these new details.

The bursting steel details consist of a system of threaded rods and plates at the beam ends followed immediately by a standardized spacing of G1 and G2 bars. These details have demonstrated better performance in reducing bursting force cracks in the beam ends caused by the detensioning forces of the strands. Additionally, the permissible crack guidelines of the "Manual for Inspectors of Precast Prestressed Concrete Products" have recently been revised to be compatible with the proven results of the new details. These new bursting steel details replace the variations of these details which were tested on previous projects through special provisions.

A new note has been added to the base sheets requiring the beam ends to be sealed by the producer. Approved sealants for this application may be found on the IDOT web site (http://www.dot.il.gov/). Additionally, the end treatment for protecting the ends of the cut strands has been revised from an asphalt paint to a zinc dust paint compatible with the new sealants.

The conventional "z" shaped G1 shear reinforcement bars have been replaced with a # 4, "hairpin" shaped, G1 shear reinforcement bar. The new configuration allows for a one piece bar which simplifies fabrication. However, the new G1 bar size must be a # 4 bar to satisfy the AASHTO minimum bending radius restrictions. Our research indicates that reasonable spacings of a # 4 bar can satisfy the shear requirements of the Department's standard beam shapes for both LFD and LRFD designs.

Base Sheets PI-4-36, PI-4-42, PI-4-48, PI-4-54, PBT-4-63, and PBT-4-72 have been revised and the following new base sheets have been added: PI-4-36D, PI-4-42D, PI-4-48D, PI-4-54D, PBT-4-63D, and PBT-4-72D. The new and revised base sheets are laid out with the intention of having one beam base sheet for each span length and one detail base sheet for each beam depth. For example, a four span 63" Bulb-T structure with spans of 75', 114', 114', and 100' would require a separate PI-4-63 base sheet for the 75', 114', and 100' spans and one PI-4-63D base sheet for a total of 4 base sheets. Additional revisions were required on the bearing base sheets PI-2E-1, PI-2E-2, PI-2E-3, and PI-2FB to accommodate the new beam details. All of the new base sheets are dated 7-15-05 and may be found in the MicroStation v8 prestressed cell library on the IDOT web site.

Designers are encouraged to implement the new base sheets on all applicable projects which have not been let; however, all projects beginning with the November 18, 2005 letting shall utilize the new base sheets.

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